



# Our VOICE

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INNOVATION

## CEMEX commissions five wind turbines at two California operations

The statewide generating capacity of the turbines is 7.2 megawatts

As part of a commitment to securing clean energy for powering our plants, CEMEX USA commissioned five wind turbines in California at the Madison quarry and at the Victorville cement plant, with a total generating capacity of 7.2 megawatts.

The wind turbine projects, which result in zero emissions, promote our goals of reducing the carbon-footprint of our operations and advance our progress on the path towards a more sustainable future.

The wind turbine in Madison, Calif. generates enough energy to power over 200 average-sized American households annually, while preventing 1,500 tons of CO<sub>2</sub> emissions. Nearly 30 percent of the quarry's energy consumption is produced by the turbine.

The remaining four wind turbines are at the Victorville cement plant and generate enough energy to power more than 1,500 average-sized American households annually, preventing over 11,000 tons of CO<sub>2</sub> emissions. Approximately 6 percent of the facility's energy consumption will be produced by the turbines.

"Our progress towards a more sustainable, energy-efficient and cost-effective future is a priority," said Karl Watson, Jr., President of CEMEX USA. "CEMEX is proud to represent a successful model of the use of renewable energy in the industry."

CEMEX partnered with Foundation Windpower, a California-based distributed wind development company, for the development, construction, financing, and operation of the wind turbines.

"These projects demonstrate

CEMEX's commitment to find creative ways to save costs and comply with increasingly stringent air quality regulations in California," said Matt Wilson, CEO of Foundation Windpower. "If more companies could follow CEMEX's visionary commitment to find new ways to operate industrial facilities in a sustainable fashion, then the world would be a better place."



The wind turbine at the Madison quarry was commissioned in October 2012 and was CEMEX's first wind turbine project in the U.S.



Earlier this year, CEMEX hosted a ribbon-cutting event in honor of the commissioning of the four turbines at the Victorville facilities.

Left to right: Bob Kries, Southern California Edison; Joe Pimental, President of Foundation Windpower; Blaskar Dusi, Corporate Energy Manager, Process Technology & Sustainability; Karl Watson, Jr., President of CEMEX USA; Luis Oropeza, EVP, Cement Operations; Cesar Millan, Victorville Plant Manager; and Matthew Wilson, CEO of Foundation Windpower.



CEMEX and Foundation Windpower  
invite you to attend the  
commissioning of four wind  
turbines at CEMEX Victorville.



**Tuesday, February 19, 2013  
12:00 p.m. to 2:00 p.m.**

CEMEX River Plant  
16888 North "E" Street  
Victorville, CA 92394

*About the wind turbine projects at CEMEX Victorville:*

*CEMEX Black Mountain Quarry*

- Two 1.5 MW Wind Turbines
- Annual production: 7,400,000 kWh
- The power generated by each will offset approximately 8 percent of total energy use.

*CEMEX River Plant*

- Two 1.6 MW Wind Turbines
- Annual production: 6,400,000 kWh
- The power generated by each will offset approximately 10 percent of total energy use.

Lunch will be provided, followed by a presentation on the goals of the project.  
You are also invited to an optional tour of the Quarry Plant following the event.

**Please RSVP by February 15, 2013 with Cindy McCarty at [cindy.mccarty@cemex.com](mailto:cindy.mccarty@cemex.com).**

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**CEMEX USA**  
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CEMEX USA is an industry leader in the production and supply of Cement, Aggregate, Ready Mix Concrete and related building products.  
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## Energy Management

CEMEX understands the importance of sustainable development and continually seeks ways to reduce the environmental footprint of its operations. Throughout our history, we have focused on improving the environment and reducing energy consumption.

The CEMEX sustainable operation strategy is based on increasing the use of renewable energy sources and energy efficiency in our operations, replacing traditional fuels with carbon neutral alternatives, reducing clinker content in cement, and exploring new carbon-reduction options. CEMEX set a goal of reducing carbon emissions by 25% per ton of cement by 2015 (from a 1990 baseline) and reducing NOx emissions by 15% by 2015 from 2005 levels. CEMEX already achieved significant progress in reducing its specific carbon emissions by 20.5% and NOx emissions by 19% in 2010.

### CEMEX USA and ENERGY STAR®



With the intent of achieving its goals in energy management and sustainability, CEMEX USA created an energy management program, based on principles of the U.S. EPA's ENERGY STAR® program in 2007. Since the program's launch, several CEMEX USA operations have received the prestigious ENERGY STAR® certification, which represents their standing among the top 25% of cement plants with regards to energy performance. CEMEX's recognition demonstrates the success of several projects that have increased energy efficiency, such as installing energy conservation and monitoring technologies, conducting energy audits to reduce unnecessary power usage, and installing area power metering equipment to better manage consumption.


The following CEMEX cement manufacturing plants have received ENERGY STAR® certifications:

- Cincinnati (2007, 2011)
- Louisville (2007, 2011)
- Miami (2011, 2012, 2013)
- Brookville South (2012, 2013)
- Falmouth (2012, 2013)
- Huntsville (2012, 2013)
- Cincinnati (2009, 2010, 2011)
- Bakersfield (2011)
- Knoxville (2009)

Read about CEMEX USA's most recent cement plant certification [here](#).

In 2009 and 2011, CEMEX USA also received the EPA's highest honor, the ENERGY STAR® Partner of the Year Award, which recognizes partners for their commitment to successfully managing energy use and meeting ENERGY STAR goals within their organizations.

### Wind Energy



In 2012, CEMEX USA commissioned its first U.S.-based wind turbines at its quarry facility in Madison, California, in collaboration with Foundation Windpower, demonstrating an commitment to reducing CO2 emissions through the use of renewable energy. The success of the project led to the construction of four additional wind turbines at CEMEX's quarry in 2013, an effort that solidifies CEMEX's role as leader on the industry's path towards a more sustainable future. [Click here](#) to read more about CEMEX USA's wind turbine program signing.

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http://www.cemexusa.com/Sustainability/EnergyManagement.aspx Fri Sep 13 2013 11:44:30 GMT-0500 (Central Daylight Time)

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2 October 2013

Dear Bhaskar,

The article, 'Reaping the Benefits of Energy Efficiency', has been published in WORLD CEMENT's October 2013 issue, starting on page 69. Please find enclosed your complimentary contributor copy of the issue. I hope you agree that the article looks great.

I would also like to draw your attention to the fact that WORLD CEMENT operates a reprints service for all articles published in the magazine. If you are interested in purchasing reprints of the article please contact our Reprints Department, [catherine.gower@palladian-publications.com](mailto:catherine.gower@palladian-publications.com); tel: +44 (0) 1252718999 for a quote. You may also wish to consider purchasing a PDF copy of your article.

I hope you enjoy this issue of WORLD CEMENT and are pleased with the presentation of your article. If you have any queries regarding any of the above please do not hesitate to get in touch. I look forward to working with you again soon.

Kind regards,



Katherine Guenioui  
Editor  
WORLD CEMENT

# Reaping the Benefits of Energy Efficiency

Bhaskar Dusi,  
Corporate Energy  
Manager, and Kevin Kelley,  
VP – Process Technology  
& Sustainability, Cemex,  
USA, provide insights  
into integrating  
utility sponsored  
incentives into an  
energy management  
programme.

## Abstract

Today's economic and environmental climate calls for efficient energy consumption and management. Cement manufacturing is an energy intensive process requiring significant thermal and electrical energy components. Total energy input accounts for more than 35% of the cement manufacturing cost in the US.

Energy management needs to be a core activity in any company's business plan and commitment to sustainability. Undertaking projects for energy efficiency and renewable energy is a challenge under the existing constrained capital investment environment considering the higher rate of return requirement. Many utility companies offer incentives for undertaking energy efficiency and renewable energy projects. An Energy Management Programme should integrate these utility sponsored incentives into the economic evaluation to improve the feasibility and payback of such projects.

Companies will benefit by reducing their energy consumption and thereby reducing their manufacturing cost. Utilities will get the benefit of achieving their renewable

energy goals and reducing the load on the power grid, thereby avoiding installation of new power generating stations.

In this article the authors look at a few specific projects undertaken by Cemex in the US, where utility sponsored incentives were effectively used to implement energy efficiency and renewable energy projects within the cement industry. Also, Cemex Demand Response and Interruptible Load Programmes participation initiatives are discussed.

## Introduction

The cement industry, along with other industries, is undergoing major challenges with respect to energy. Energy costs continue to rise, energy markets are volatile, future energy availability is unknown and environmental regulations due to climate change present unprecedented pressure on manufacturing. All of these factors amount to an uncertain future for energy supply and pricing. Efficient energy consumption and management with a long-term corporate energy strategy are necessary in order to mitigate many of the

challenges that face the industry and impact on manufacturing costs.

While cement manufacturing facilities in the US have made significant progress in becoming more energy efficient over the past several decades, there is an opportunity to accelerate and expand these efforts with investments to reduce energy use through more efficient manufacturing processes and facilities. Accelerating these investments can improve the competitiveness of manufacturing, lower energy costs, and free up future capital for businesses to invest in other areas.

### Guidelines for a successful energy management programme

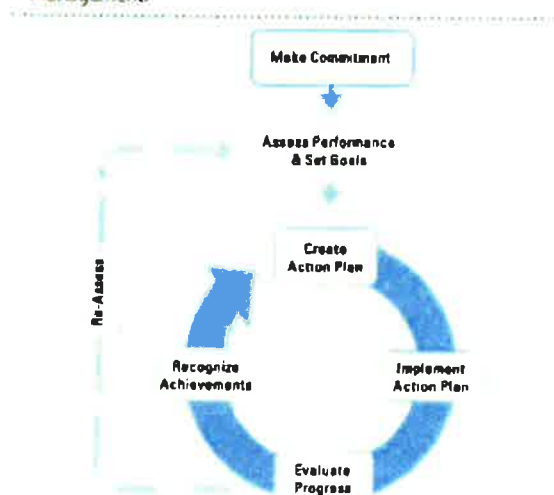
It is very important for companies to establish an energy efficiency culture by applying the fundamentals of energy efficiency through executive leadership. The US Environmental Protection Agency's voluntary programme, ENERGY STAR®, developed Guidelines for Energy Management (Figure 1) outline these fundamentals. These guidelines recommend companies

develop metrics, track energy consumption, benchmark, set goals, create an action plan, evaluate progress, and create energy awareness throughout the organisation.

Following the ENERGY STAR® guidelines enables companies to integrate energy efficiency into their existing management system for continuous improvement and to achieve the traits of a highly energy efficient company, which are:

- Efficiency is a core strategy.
- Leadership and organisational support is real and sustained.
- Company has SMART energy efficiency goals.
- Strategy relies on a robust tracking and measurement system.
- Organisation puts substantial resources into energy efficiency.
- Energy efficiency strategy shows results.
- Company effectively communicates results.

Figure 1. ENERGY STAR® Guidelines for Energy Management.



### Overview of utility incentive programmes

Many utilities provide financial incentives to organisations that implement renewable energy or energy efficiency projects. A utility incentive programme can often fund up to 75% of a qualifying project. These programmes have been in existence for many years, but only recently have the utilities recognised the need to reach out to consumers as industrial energy use continues to grow. Integrating these incentive programmes into a company's energy management programme and learning how to streamline the application process and receive incentive funds can be a substantial help when justifying many projects.

Most incentive programmes are established by a public utilities commission or regulatory body. The requirements of a programme can vary according to the utility's specific intent, such as demand side management and energy generation requirement and regulatory requirements such as renewable energy standards. Many programmes result from a long-term planning process that examines the utility's future loads and the resources required to meet those loads. Funding a conservation or efficiency project is one of the lowest cost

strategies a utility can employ to help meet future resource needs.

The exact process for each utility programme is varied, but most utility programmes follow similar steps for participation as shown below:

- **Application:** customer provides proposal or project details to utility.
- **Analysis:** utility evaluates the project against programme criteria.

Table 1. Cemex wind projects in California

Location	Aggregate quarry Madison, CA	Black Mountain quarry Victorville, CA	River plant Victorville, CA
Number of turbines	1	2	2
Turbine capacity each (MW)	1.5	1.5	1.6
Turbine tower height (m)	65	65	80
Blade diameter (m)	77	77	82.5
Total average annual energy production (kWh)	1 808 000	7 400 000	6 400 000
% of facility's energy consumption	25	6	6
Equivalent American homes powered annually	203	800	700
Avoided carbon emissions annually (t)	1390	5400	4500

- **Approval:** utility formalises contract and executes agreement with customer.
- **Baseline:** measurement of pre-project energy consumption.
- **Implementation:** customer completes project and informs utility.
- **Verification:** verification of project completion and savings by third party.
- **Incentive release:** utility reviews verification and releases incentive payment to customer.

Incentive amounts are generally set by the local regulatory body, such as a public utility commission. Determination of appropriate incentives for a project is normally based on established goals for renewable energy projects or cost benefit analysis based on energy and/or demand reduction in the case of electrical energy efficiency projects. Some utilities conduct industrial efficiency audits, provide technical assistance, and participate in the financing of the efficiency improvements.

Every utility will have different types of incentive programmes, but in general there are two types of incentives. Standard incentives are for small projects (residential, small commercial, etc.), wherein the amount of incentive is fixed or based on a standard formula. The other type of incentive is custom or calculated incentive. Most industrial projects come under this category, with the amount of incentive being linked to project cost and savings achieved. The incentive amounts vary significantly from project to project and company to company.

It is very important to engage with the local utility company representative from the start of a project concept; have a well-defined project scope and baseline, knowledge of baseline and verification requirements, and maintain a record of the performance in order to maximise the incentive amount.

## Case studies of projects undertaken in Cemex

### Renewable energy projects

Cemex understands the importance of sustainable development and continually seeks ways to reduce the environmental footprint of its operations. Incorporated in 1906, Cemex is one of the largest building materials suppliers in the world. Cemex produces, distributes and markets cement, ready-mix concrete, aggregates and other building materials to customers in more than 50 countries. Its sustainable operations strategy is based on increasing the use of renewable energy sources, replacing traditional fuels with carbon neutral alternatives, reducing clinker content in cement, and improving energy efficiency in its operations.

Cemex started evaluating the feasibility of developing wind power generation projects at facilities in the US. Subsequently, detailed review of various sites in California and other states were conducted with respect to wind source availability and project economics. Cemex teamed up with Foundation Windpower to develop wind power projects in California. Foundation built, operates, and maintains the wind turbines that supply electricity to three Cemex California facilities. Details of the wind turbines currently installed at Cemex US facilities are provided in Table 1.

Figure 2. Wind turbines at Black Mountain quarry.



Cemex utilised incentives available under California's Self Generation Incentive Programme (SGIP), which provides financial incentives for the installation of new technologies to meet all, or a portion, of the electric energy needs of a facility. The purpose of the SGIP is to create a more reliable electric transmission and distribution system and facilitate reductions in greenhouse gas emissions and utility grid demand by reducing customer electricity purchases. Incentives under this programme are available up to 3 MW of installed wind power capacity, as shown in the graduated scale in Table 2.

### Demand Response and Interruptible Load Reliability programmes

Demand Response and Interruptible Load Reliability programmes are offered by many utilities to help control utility peak load by enticing customers to reduce or shift their electrical energy load to non-peak hours through incentives. Shifting operating hours and reducing the peak electrical load through demand response results in the following benefits for the utility and consumer:

- Reduction in required peaking generation capacity.
- Reduction in required transmission and distribution capacity.
- Reduction in electrical costs.

Almost all utilities in the US offer some form of demand response programme to customers. These programmes are mandated by public utility commissions to avoid greenhouse gas emissions. Each programme is different and formulated to suit the needs of the state. Rules of participation and incentive amounts vary widely. Many of them require a mandatory annual test to demonstrate the capability of the facility to comply with curtailment events initiated by the utility.

Cemex participates in demand side management and power demand response offered by local utilities. Curtailment efforts through participation in these programmes effectively contribute to grid reliability, helping to avert chances of rolling power outages, or blackouts, in local communities. These programmes also improve the grid efficiency and contribute to the reduction of indirect environmental emissions. By adjusting equipment operating strategies to allow participation in the

demand response programme, one cement plant received over US\$800 000 incentive in just one month. These funds will be used as capital expenditure when implementing energy efficiency and alternative fuel projects to help in achieving established sustainability goals.

### Energy efficiency projects

Energy surveys and audits are conducted at Cemex plants on a regular basis by corporate technical services and external energy consulting organisations to identify improvement areas and develop projects. Incentives and grants from utilities, as described above, are considered when undertaking these projects to improve the financial aspects and justification. Two of the many projects undertaken in Cemex US cement plants using utility incentives and the savings achieved are described below.

#### Variable frequency drive (VFD) project

A large process fan of 2500 hp was running at constant speed with the airflow being controlled by an inlet damper. After detailed investigation, the plant identified that replacement of the damper on this fan by installing a VFD to control airflow would save significant electrical energy. Since the project was capital intensive, Cemex approached the energy efficiency division of the local utility and submitted a proposal for consideration of incentive funds to undertake the project.

After initial review, the utility nominated a third party consultant to conduct independent baseline measurements for power consumption and confirm the potential savings. The utility approved the project and reserved incentive funds based on the predicted demand improvement, energy savings, and estimated project cost. After completion of the project, the plant collected actual data for a period after installation of the VFD and incentive funds were adjusted based on the actual power demand of the fan and actual cost of the project. The plant received about US\$500 000 incentive from the utility for this project. Details of this project are provided in Table 3. In addition to this process fan, the plant also reduced power consumption of the downstream baghouse fan by reducing the pressure drop across the system; the baghouse fan does not have to overcome the damper restriction to get the same flow of gases.

Table 2. California SGIP incentives

Installed capacity	Incentive (million US\$)
0 – 1 MW	1.5
>1 MW – 2 MW	0.75
>2 MW – 3 MW	0.375

Table 3. Cemex variable frequency drive project

	Baseline (before project)	Actual (after project)
Average fan power (kWh/day)	63 727	38 440
Annual power usage (kWh)	21 563 643	13 007 207
Annual energy savings (kWh)		8 556 436
Annual cost savings (US\$)		684 515

#### Compressed air project

Cemex identified the importance of replacing old, energy-intensive air compressors with modern high-efficiency systems to reduce energy consumption in their cement plants. Air Demand Analysis (ADA) studies were conducted by a major compressor supplier to identify compressed air demand and supply issues at many of the plants. Projects were developed as a result of the studies to replace all older, less efficient, and maintenance-intensive compressed air systems with new generation efficient compressors, driers, and upgraded control and piping systems.

At one plant, the company replaced an aging compressed air system that consisted of five compressors of varying horsepower operating 24 hours a day and consuming more than 4.5 million kWh annually to meet the plant's air demand. Five new units now serve the plant's compressed air needs on a significantly less 2.0 million kWh of electricity annually, for savings of more than 2.5 million kWh each year. In addition to the power cost savings, the plant also reduced maintenance costs as fewer repairs were needed for the new compressors. All with a higher availability of quality compressed air.

This specific plant applied for a rebate from the local utility established under a state law that mandates investor-owned utilities reduce electric power consumption by 22% by 2025. The project was approved by the utility and Cemex qualified for the rebate. Measurement and verification of actual performance was completed by a third party organisation appointed by the utility. After the project savings were confirmed, Cemex received the highest rebate that the utility has ever sanctioned in their territory.

### Conclusion

Energy management has to be a core activity in a company's business plan. Assessing plant performance and identifying opportunities are required to achieve energy efficiency, environmental improvement, sustainable development and lower costs. Utilising available incentives offered by utilities can ensure that limited company resources are used effectively to accomplish energy efficiency goals.

Difficulty in financing energy efficiency projects due to longer payback period and competing capital investment demands can make energy efficiency a lower investment priority. Volatile energy prices create uncertainty and can impede investment decisions. Participation in various utility sponsored demand response programmes and taking advantage of utility rebates/incentives for these projects will lessen the requirement of capital investment and expedite top management approval for these projects. Everyone is trying to find the next innovative project that will improve operations; today it takes innovation to finance and accomplish that project. 🔥

### Sources

- US EPA - ENERGY STAR® website, [www.energystar.gov/guidelines](http://www.energystar.gov/guidelines)
- State of California, "2013 Self-Generation Incentive Programme (SGIP) Handbook", 1 February 2013.



Building the future™

# Es

Elements of Sustainability

CEMEX understands the importance of sustainable development and continually seeks ways to reduce the environmental impact of our operations.



The health, safety, and well-being of our people are of paramount importance to us and we continually monitor our safety progress to ensure that our programs are working as effectively as possible.



We are committed to mitigating the impacts that our plants can have on surrounding communities. We have implemented a set of environmental initiatives to support air and water quality, land management, and conservation efforts.



We leverage our core strengths, our employees' talent and time, and our social investments to support the social and economic development of our communities.



We continue to implement cutting-edge technologies and state-of-the-art lines to improve the energy efficiency of our operations.



CEMEX provides transparency into our operations through annual environmental, health and safety (EHS) reports and through our comprehensive sustainable development reports.



# To build the future is to protect it.

## CEMEX Madison Quarry Wind Turbine

### Height of Structure -

- Hub height: 213 ft.
- Ground to tip of blade: 339 ft.

### Blade Diameter: 253 ft.

### Annual Production: 1,808,000 kWh

### Percentage of facility's energy consumption produced by turbine: 20 to 30%

### The power produced by the turbine:

- is equivalent to powering over 203 average American households annually.
- avoids consumption of 1,102 barrels of oil.
- eliminates 1,530 tons of carbon emissions.

### About CEMEX

CEMEX is a global building materials company that provides high quality products and reliable service to customers and communities in more than 50 countries throughout the world. CEMEX's U.S. network includes 13 cement plants, 47 active cement distribution terminals, more than 100 aggregate quarries and more than 440 ready-mix concrete plants. For more information, visit [www.cemexusa.com](http://www.cemexusa.com).

### About Foundation Windpower

Foundation Windpower develops, finances, constructs, owns, and operates utility-scale distributed wind projects on-site at large energy consumers. Our projects, which total 22 MW of production capacity, require no capital expense from customers. Foundation Windpower creates an immediate and sustained reduction in energy costs while delivering 100% renewable electricity through long term power purchase agreements. Customers include cement plants, mines, food processors, manufacturers, refrigerated warehouses, data centers, and water treatment plants where Foundation Windpower deploys utility-scale wind equipment in 1 MW to 5 MW configurations on-site. Foundation Windpower has offices in Menlo Park and San Francisco, Calif.





Building the future™

# ES

## Elements of Sustainability

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We continue to implement cutting-edge technologies and state-of-the-art plans to improve the energy efficiency of our operations.



CEMEX provides transparency into our operations through annual environmental, health and safety (EHS) reports and through our comprehensive sustainable development reports.



### About the Victorville Plant

The CEMEX Victorville plant has been in operation since 1917 and produces Portland and hydraulic cements for use in area homes, roads, schools and businesses in Southern and Northern California, Nevada and Arizona. As the largest cement plant in the state, the Victorville operation employs approximately 230 local men and women, partners with numerous vendors throughout the state, and is an integral part of the High Desert communities.

### Our Values

The safety of our employees, responsible stewardship of our environment, and giving back to the communities in which we live and work are top priorities at CEMEX.

The Victorville cement plant recently completed the construction of two windmills that will generate 6.2 megawatts of wind energy for the facility, further advancing CEMEX's sustainability goals through a reduction of carbon fuels as energy. CEMEX Victorville also recently received the EPA's prestigious Energy Star® certification in 2011, demonstrating the Victorville team's outstanding leadership efforts in energy management.

The Victorville cement plant participates in numerous community events, which demonstrates its commitment to education and environmental outreach. Recently, the Victorville plant taught students from the Vanguard elementary and middle schools how to raise Painted Lady butterflies for their release in a desert oasis created on the plant's property. Employees from CEMEX Victorville are also active in Women in Mining, a non-profit organization that educates the community, teachers and students about the benefits and uses of mining and its minerals.

### About CEMEX

CEMEX is a global building materials company that provides high quality products and reliable service to customers and communities in more than 50 countries throughout the world. CEMEX's U.S. network includes 13 cement plants, 47 active cement distribution terminals, more than 100 aggregate quarries and more than 420 ready-mix concrete plants. For more information, visit [www.cemexusa.com](http://www.cemexusa.com).



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A MINING MEDIA PUBLICATION

## **BLOWIN' IN THE WIND**

**BY MARK S. KUHR**

The answer, for some quarries, just may be "blowin' in the wind." Cemex has commissioned a 1 megawatt (MW) wind turbine at its quarry located in Madison, Calif. The turbine is one of three renewable energy projects Cemex will soon bring online in California.

Cemex is planning to bring two additional wind power projects online later this year at its facility in Victorville, Calif., which will feature 6.2 MW of generating capacity.

The power generated from the Madison, Calif., wind turbine is equivalent to powering over 200 average-sized American households annually. The turbine, which has zero emissions, will prevent more than 1,500 tons of CO<sub>2</sub> emissions each year. Nearly 30 percent of the quarry's energy consumption will be produced by the turbine.

**"We are committed to operating our facilities in the most sustainable, energy-efficient and cost-effective manner possible," said Karl Watson, Jr., president, Cemex USA.**

**"These renewable energy projects align with this commitment as we continually seek ways to reduce the carbon footprint of our operations."**

Cemex partnered with Foundation Windpower, a California-based distributed wind development company, for the development, construction, financing, and operation of the wind turbine.

Present at a ceremony commissioning the project were:

- Karl Watson Jr., president of Cemex USA.
- Luis Farias, Senior VP of energy and sustainability at Cemex.
- Matthew Wilson, CEO of Foundation Windpower.
- Congressional candidate Kim Vann (R-Calif.)

The Cemex projects in California will serve as an example for the rest of the country, and if successful, may provide a blueprint for other quarries to follow in the quest to keep energy costs as low as possible. ♦



## WANT WIND POWER?

You will need:

- At least 350 kW maximum demand.
- Location with wind resources.
- A permitable, rural location.
- Space onsite.
- FAA approval.

For more information,  
Call 415-515-3404  
or go to  
[www.foundationwindpower.com](http://www.foundationwindpower.com).

## A Wind-Win Situation

By Mark S. Kuhar

Nine out of every 10 articles written on the topic of wind power will likely contain the Bob Dylan song lyric, "the answer is blowin' in the wind." But I submit to you, the questions are blowing in the wind.

What if your quarry operation could save hundreds of thousands to millions of dollars in power costs over the life of their projects? What if you could generate renewable energy and make your community and the surrounding environment cleaner? What if you could reduce greenhouse gas emissions and stabilize energy costs, while preparing your company to comply with future carbon emission requirements?

It's pretty enticing to think about, isn't it?

Enter San Francisco-based Foundation Windpower. The company's on-site wind-generation solutions enable aggregates operations to realize substantial savings on their total energy costs, according to the company.

"When we started the company in 2008 we were looking for large energy users," said Bob Lewis, vice president sales and marketing. "But we were also concerned about location, as it is not easy to permit 350-ft. wind turbines. Aggregates operations fit the bill perfectly."

The company offers its customers access to discounted renewable power with no upfront or ongoing investment. Their project delivery structure is optimized to minimize financial and operational risks to its customers. Foundation Windpower pays for the construction and maintenance of turbines and sells electricity to its clients via long-term electricity purchase agreement.

"Payback starts immediately upon commissioning," Lewis said.

Foundation Windpower offers Power Purchase Agreements (PPAs) at either a fixed price or a discount indexed to below utility rates. This allows customers to choose the solution that best meets their operational and financial planning needs.

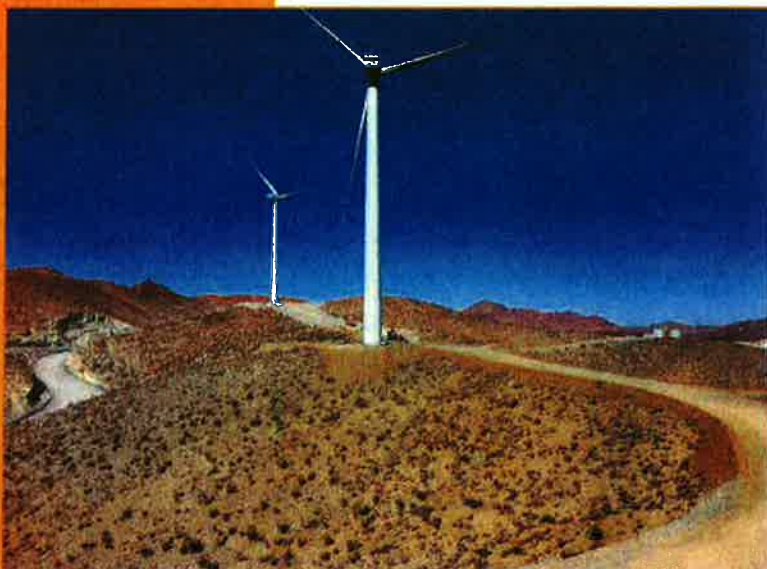
"Net Energy Metering laws make our projects feasible even if a customer's operation does not run 24 hours a day," Lewis said. "If a facility operates at night, they can use power at a much lower rate than when they operate during the day. When turbine generation exceeds customer demand, or if energy is generated when a customer facility is not running, the excess energy runs back into the grid, and the customer receives a credit from their utility."

Conversely, when the wind is idle or customer demand exceeds turbine production, the customer buys grid power as usual, or a combination of grid and turbine power. Our customers' operations face no power disruption from our wind turbines; the wind turbines and grid operate seamlessly in parallel."

### Teichert Aggregates

Teichert Aggregates, Vernalis, Calif., produces rock and sand for projects in locations throughout Northern California and the Central Valley. Teichert chose Foundation Windpower to generate renewable energy for its Tracy, Calif., plant and make their community and its surrounding environment cleaner.

Teichert's 1.5-megawatt, 390-ft.-tall GE wind turbine supplies up to 20 percent of the facility's electricity. This renewable energy lowers operating costs, enables the company to



## CEMEX UK First to Label Cement Products to Recognized Standard

CEMEX UK is using the results from the CO<sub>2</sub> Footprint Tool to generate the information required to achieve a certified carbon label for cement to the standard PAS2050. This is the first and only instance globally where a company has labeled its cement products to a recognized standard.



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CEMEX also pursues Verified Carbon Standard (VCS) initiatives in the US with four projects currently underway. We registered our first project at our cement plant in Louisville, Kentucky. The initiative aims to substitute fossil fuels with alternative fuels and has the potential to reduce emissions by as much as 300,000 tons of CO<sub>2</sub> per year.

### Carbon Footprint Tool

A key pillar of our CO<sub>2</sub> reduction efforts is our Carbon Footprint Tool (CFT) that helps us to quantify the direct and indirect amount of CO<sub>2</sub> emitted during the production process of cement, concrete and aggregates up until the product leaves our facilities. Embedded carbon dioxide in raw materials and contributions by suppliers are included in the tool's calculations.

Developed in accordance with international protocols, the tool and its methodology have been verified by DNV, an independent foundation and one of the world's leading assessment and certification organizations that provides services for ensuring the protection of life, property and the environment.

Implementation of the CEMEX CFT has grown from 29 percent of our sites in 2010 to 100 percent of cement, aggregate and ready-mix sites under our operational control in 2012. Through this effort we are now in a position where we can provide CO<sub>2</sub> footprint information on all of our cement, concrete and aggregate products to customers in all countries where CEMEX operates.

### Transportation Strategy

We recognize the need to pay special attention to the potential impacts that our transportation activities may have on the environment and society. Therefore, we strive to have a sustainable transportation strategy that helps us increase our fuel efficiency by creating well-



designed routes with the largest loads possible and find innovative solutions to reduce fossil-fuel consumption.

We operate more than 16,000 mobile equipment units around the world that use diesel; approximately 12,000 on-road and 4,000 off-road. CEMEX has started pilot tests in eight countries with a fuel additive that potentially reduces diesel consumption by approximately four percent. The use of this additive will allow CEMEX to reduce its CO<sub>2</sub> emissions and achieve cost savings, even when international fuel prices increase.

According to the US Environmental Protection Agency, burning one gallon – 3.78 liters – of diesel fuel emits 10.18 kg of CO<sub>2</sub>. Through this initiative, CEMEX looks to reduce transportation-associated CO<sub>2</sub> emissions by around 35,000 tons per year.